



The Cebrowski Institute
for Information Innovation and Superiority

Naval Postgraduate School Initiatives in the Education and Research of Critical Infrastructure Protection

**Presented at the 2003 USPACOM
Critical Infrastructure Protection (CIP)
Conference and Workshop**

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Naval Postgraduate School**



Reasons for Presenting

- To inform the DoD community of the CIP educational initiatives taking place at the Naval Postgraduate School (NPS)
- To inform those in the industry of the expertise available to them at the Naval Postgraduate School
 - Academic knowledge
 - Degrees and short courses
 - Our ability to assist with research through such avenues as student thesis work and more in-depth examination by our scholars
- Assist in the development of a new SECRET level course on CIP at NPS



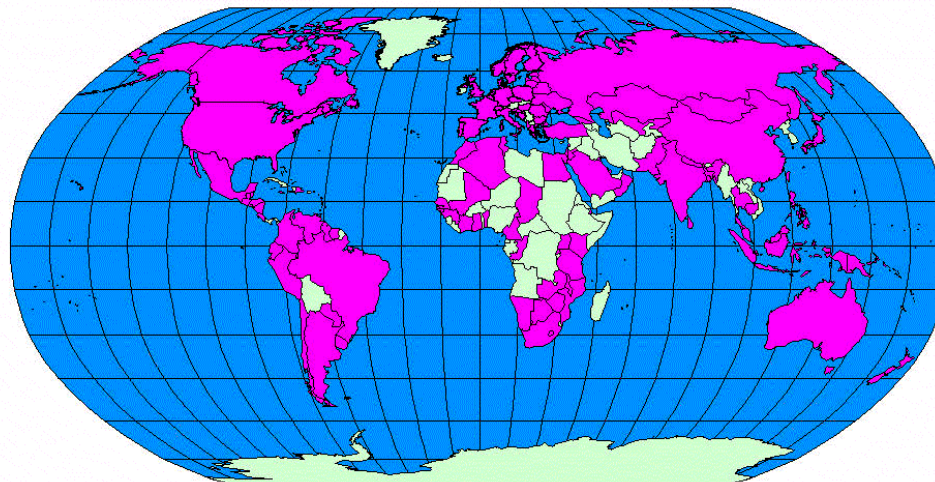


The Naval Postgraduate School

- To meet its educational requirements, the Navy has developed a unique academic institution at the Naval Postgraduate School (NPS) whose emphasis is on education and research programs that are relevant to the Navy, defense and national and international security interests. NPS provides a continuum of learning opportunities, including Graduate Degree Programs, Continuous Learning Opportunities, Refresher and Transition Education.

■ Graduates
■ No Graduates


NPS Influence on the World





Naval Postgraduate School Graduates

- **Annually**, the Naval Postgraduate School graduates:
 - **For Advanced Degrees:**
 - Over 2000 US students representing all the departments of DoD
 - Hundreds of international students from around the world
 - **For Short Course:**
 - Tens of thousands of US students
 - In the *thousands* for our international students



Students	U.S. Graduates					
	Degree			Short Courses		
	1998	1999*	2000**	1998	1999*	2000**
USN	1055	1439	1365	4240	4091	3243
USMC	320	260	363	266	266	663
USA	207	186	178	1421	1299	1756
USAF	41	54	54	2688	2572	4988
USCG	38	21	43	50	42	93
Federal	397	63	152	24	24	20
Other	0	0	0	2147	2015	2492
Total	2058	2023	2155	10,836	10,309	13,255

* 1999 data includes year-to-date and projections
** 2000 data is projected



CIP Initiatives at the NPS

- Naval Postgraduate School's CIP initiatives are being lead through the combined efforts of the:

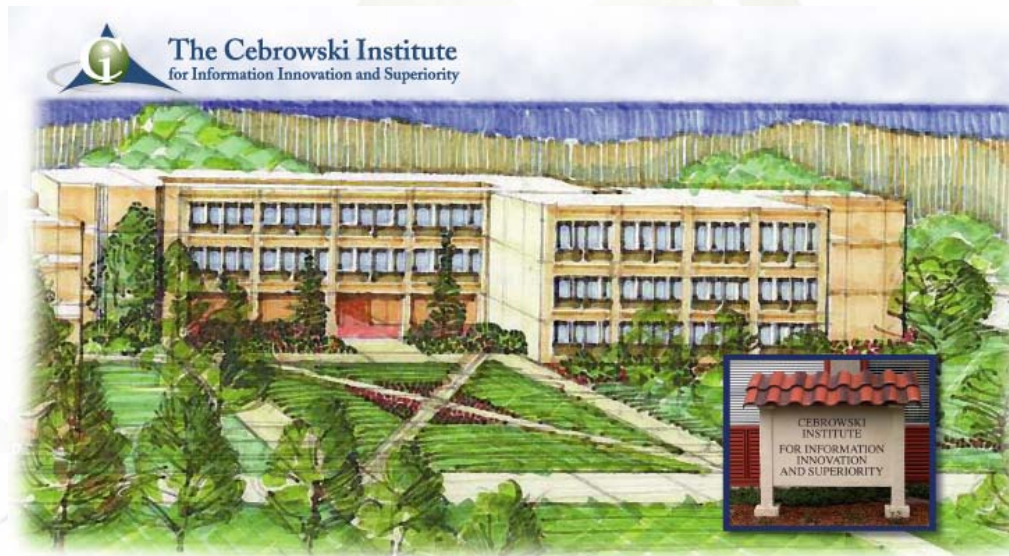
**Cebrowski Institute
for Information Innovation and Superiority
&
Center for Homeland Defense & Security**



The Cebrowski Institute

Institute Vision

To be the center for innovative research and education in enabling information technologies, operations, and strategies, with focus on their development and application for national security



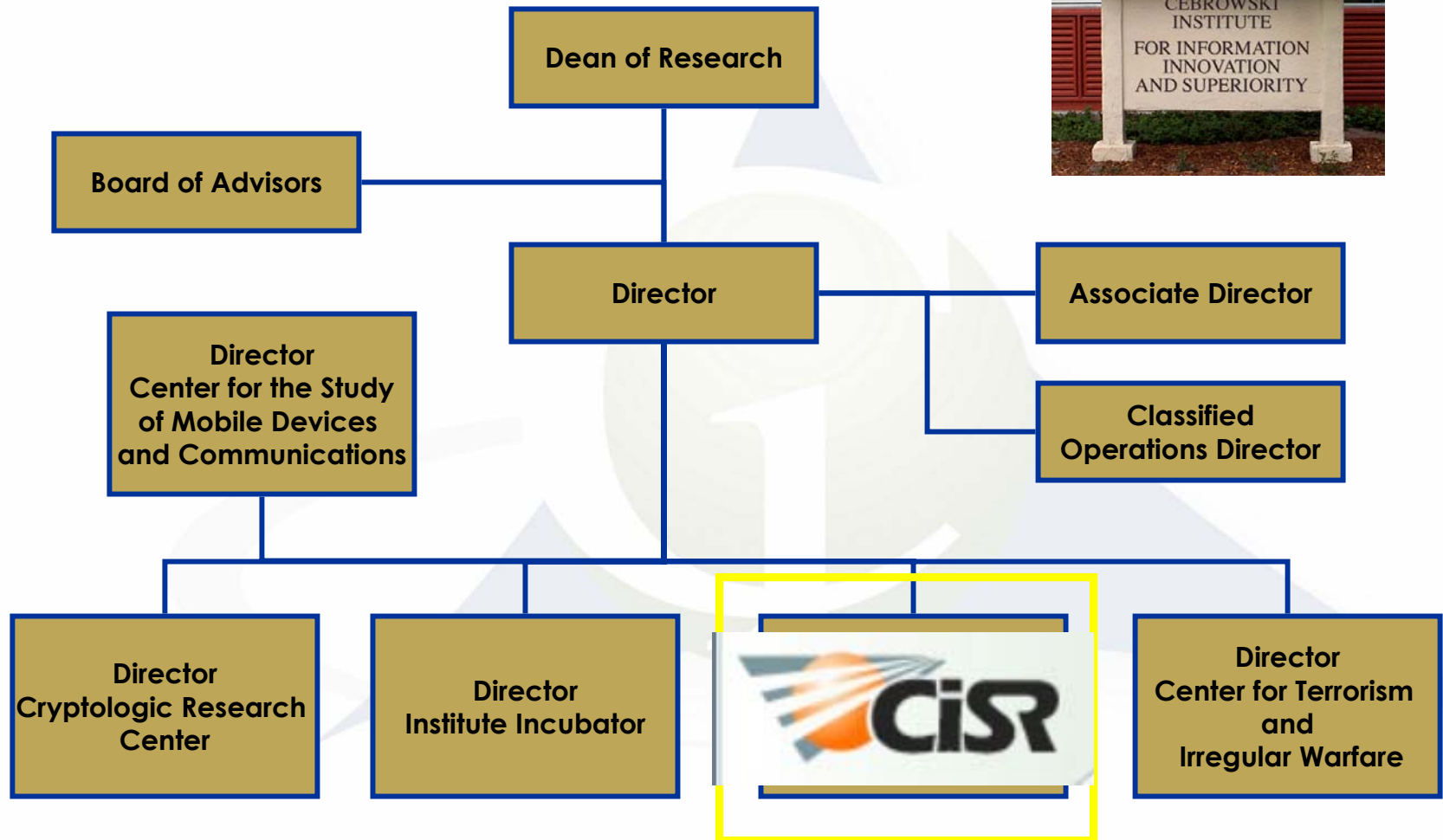


Institute Research Objectives

- Conduct research pertinent to national security
 - Strong emphasis on Navy-relevant research
- Collaborative research between DoD, government, academe & industry
- World-class facilities for information innovation
- Student thesis opportunities and support
 - Classified/Unclassified research
- Sponsor associated publications and conferences
- Address operational challenges through research
- Research and education to support
 - Force Projection
 - Information Superiority
 - Trustworthy Infrastructure



Institute Organization





Institute Advisory Board

- **Advisory Board provides perspective and guidance on support for educational programs, research and development efforts.**
 - VADM Richard Mayo, Commander NETWARCOM
 - VADM T. M. Bucchi, Commander Third Fleet, J00
 - RADM Jay Cohen, Chief of Naval Research
 - RADM Thomas E. Zelibor, OPNAV N6
 - RADM Joseph Burns, Commander, Naval Security Group
 - CAPT James McGovern, Deputy N9, NETWARCOM
 - William Dawson, Deputy CIO, Intelligence Community
- **Guests of the Advisory Board**
 - William Crowell, President and CEO, Cylink Corporation former Deputy Director, NSA
 - Dr. Marv Langston, SAIC
 - Eugene Spafford, Professor, Director of CERIAS, Purdue University
 - Mitzi Wertheim, Center for Naval Analysis



Sample Collaborations

□ Navy & Marine Corps

- FIWC
- CNO N6
- NUWA
- DoN CIO
- PACFLT
- NWDC
- Marine Corps Tactical Systems Support Activity (MCTSSA)
- SPAWAR
- Naval Security Group
- HQ Marine Corps, C4

□ Government Labs

- Sandia National Laboratories
- Pacific Northwest National Laboratories

□ Other U.S. Military

- PACOM
- EUCOM
- CENTCOM
- DECA
- JIOC
- JFCOM

□ Industry

- Microsoft
- Getronics
- DigitalNet
- Nortel Networks
- Cylink, Corp.
- Aerospace Corp.
- Aesec Corp.
- Mitretek

□ Universities

- Purdue University
- Columbia University
- Stanford University
- University of Pennsylvania
- Iowa State University
- New Mexico State University
- U.S. Military Academy
- University of New Haven

□ Other DoD & Government

- DISA
- DARPA
- NSA
- National Ground Intelligence Center
- Intelligence Community (ICCIO)
- National Science Foundation
- NIST



Center for Homeland Defense & Security



- **Objective: Strengthen NPS' ability to assist in meeting a critical National Security challenge**
- **Formed in response to SECDEF's designation of HLS as a top priority DOD mission**
- **Sponsor: Department of Justice**



Center for Homeland Defense & Security

- **Curriculum/Research priorities**
 - **Focus on opportunities to strengthen U.S. capacity to deter, defeat and respond to threats to Homeland Security**
 - **Deal with civil-military and interagency challenges of HLS planning and operations**
 - **Include both technical and non-technical curriculum components (i.e., protection of critical infrastructure, history and policy courses)**
 - **Build modeling and simulation into the heart of the curriculum**



Role of Modeling & Simulation in CHD&S

- **Online Exercises are “Scenario-Based”**
 - **Learn-by-mistakes**
 - **Gain “training” experience**
 - **Apply the theory**
- **Welcome to San Luis Rey**
 - **Everything bad happens in San Luis Rey**
 - **Major scenario per course**
 - ✓ **Create Dept of Homeland Security**
 - ✓ **Attack on critical infrastructure**
 - ✓ **Jurisdictional conflict in CMR**
 - ✓ **Profile of the enemy - cells**



Role of Modeling & Simulation in CHD&S

- **Simulation**

- Evolutionary development/deployment
- Learning is a journey: feedback
- Ultimate goal is full-fledged Multi-agent simulations

- **Collaboration**

- Online forum - Community of Practice
- Stepping through (simulated) time
 - ✓ Students have full-time jobs
 - ✓ Attention spans are short
 - ✓ Learn from mistakes



CHD&S Program Structure

- **Mobile Education Team (MET) Seminars**
 - Reaches major regions of US (10 times/yr)
 - Assist Governor's offices (1-2 Days)
- **Executive Education for State Executives (1-2 Weeks)**
 - Senior Executives, Policy-Makers
- **Graduate Level Curriculum**
 - MA Degree option (NSA Track)
 - Certificate/Non-degree option under consideration
- **Research & Development**
 - Policy & Organizational Research
- **Digital Library - World-Class Homeland Security Resource**
 - During and After MA degree program
 - Resource for DOJ, OHS



CHD&S Research & Development

- **FY02 Research Initiation**
 - Solicited 28 Proposals across NPS
 - Dean of Research Award Committee selected 7
 - DOJ approved 6
- **FY03 Research Initiation**
 - Emphasis on Policy & HLS Organizational Issues
 - Increased support of educational program
 - Increased support of “building a discipline”



CHD&S R & D continued

- **\$400k Funding in FY02**
 - **“Emergency Response for Cyber Infrastructure Management”**
 - **“Infrared Face Recognition System”**
 - **“Optimizing Electric Grid Design Under Asymmetric Threat”**
 - **“Vulnerability of Wireless Networks”**
 - **“Concealed Weapons Detection”**
 - **“Intelligent Software Decoys”**



CHD&S R & D continued

- **\$2 Million “Anticipated” in April 2003**
- **DOJ Interested in...**
 - **Policy, Government, Organizational Studies of HLS**
 - **Simulation and Modeling as it might be applied to e-Learning**
 - **Web-based exercises in bio-terror, infrastructure protection, etc.**
 - **Budgeting & Organization research, esp. as it applies to Office of HLS**
 - **Port Safety, Transportation, esp. as it pertains to Northern Command**



CIP Courses Offered at the NPS

- **CS4920 Critical Infrastructure Protection**
 - **First offered in the Summer quarter of 2002**
 - **Its purpose:**

“To examine the critical infrastructure of the United States. Eight sectors of the critical infrastructure are examined: Banking/Finance; Health Care/Health Affairs; Space/ISR; Power/Energy; Logistics/Postal System; Transportation; Telecommunication/Satellites; and the Internet/IA”

“The intent is to describe each sector and its components, and then characterize the sector’s vulnerabilities, especially it’s interdependencies and couplings with other sectors. Ultimately the purpose is to identify potential counter measures that mitigate sector and system vulnerabilities and to assess their costs and benefits”



CIP Courses Offered at the NPS

- **CS4920 Critical Infrastructure Protection**
 - **Experts in their fields were invited to lecture on each sector:**
 - **Banking and Finance:**
 - **Dr. David Mussington, RAND**
 - **Space and ISR**
 - **Paul Wallner, VREDENBURG & CO.**
 - **Power and Energy**
 - **Dr. Tom Overbye, Univ. Illinois & PowerWorld.com**
 - **Telecommunications and Satellites**
 - **Cliff Thomas, QWEST**



CIP Courses In Development at NPS

- **Critical Infrastructure Protection: An Interdisciplinary SECRET level course**
 - Being developed by the Cebrowski Institute
 - 12 week graduate level course
 - Initial Projected Offering: Spring 2003

The objective of the course create a SECRET level interdisciplinary course that will permit students from a variety of curricula to participate in an effort to solve challenges in CIP by addressing real problems and hypothetical incidents.



CIP Courses In Development at NPS

- **Critical Infrastructure Protection: An Interdisciplinary SECRET level course (continued)**
 - **The format will be similar to its unclassified sister course, but will concentrate on the ten areas DoN has subdivided it enterprise infrastructure into:**
 - Logistics
 - Space
 - Command, Control and Communications
 - Transportation
 - Information Infrastructure
 - Intelligence
 - Surveillance and Reconnaissance
 - Public Works
 - Personnel
 - Health
 - Finance



CIP Courses In Development at NPS

- **Critical Infrastructure Protection: An Interdisciplinary SECRET level course (continued)**
 - **Phase I** of this development includes working with DoN experts to articulate the desired outcomes of this class; to discover those specific areas of vulnerabilities and issues within the DoD that require research.
 - **Phase II** will consist of the development of both the unclassified and SECRET level material required for the course.
 - **Phase III** will be the actual presentation of the course...



Closing Remarks

- The Naval Postgraduate School, in support of the DoN, is an institution *designed* to assist you with your CIP requirements.
- We can assist you, through our expertise and resources, with those areas of CIP requiring research.
 - This can include extensive individual attention through the thesis research of our students in a variety of curricula.
- As we continue to develop and mature our courses on CIP, we are always in search of additional real-world examples of CIP issues and case studies that can impart a greater understanding and knowledge to our students and faculty.
- The NPS can be an excellent avenue for subject matter experts to present their areas of expertise.



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